

Installation Guide

PTP 820F
System Release 10.9



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About This Installation Guide

This guide describes the PTP 820F installation procedures. This guide also provides initial configuration instructions for once the hardware installation is complete.

This guide contains the following chapters:

Chapter 1: [Before You Start](#)

Chapter 2: [PTP 820F Hardware Overview](#)

Chapter 3: [Preparing for Installation](#)

Chapter 4: [Installing the PTP 820F IDU](#)

Chapter 5: [Connecting the Power Cable](#)

Chapter 6: [Power Supply Notes](#)

Chapter 7: [IDU-RFU Cable Connection](#)

Chapter 8: [Performing Initial Configuration](#)

Chapter 9: [Specifications](#)

Chapter 10: [Acceptance and Commissioning Procedures](#)

What You Should Know

A PTP 820F system consists of an PTP 820F indoor unit (IDU) and one or more radio frequency units (RFUs). This manual provides instructions for the installation of the PTP 820F IDU only. Some features described in this manual may not be available in the current release. Consult the Release Notes for the functionality supported in the specific release you are using.

Related Documents

- [PTP 820F Technical Description](#)
- [User Guide for PTP 820F, and PTP 820G](#)
- [PTP 820 Series MIB Reference](#)
- [RFU-D Installation Guide](#)
- [RFU-S Installation Guide](#)
- [RFU-D-HP Installation Guide](#)

Contacting Cambium Networks

Support website: <http://www.cambiumnetworks.com/support>

Main website: <http://www.cambiumnetworks.com>

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Purpose

Cambium Networks Point-To-Point (PTP) documents are intended to instruct and assist personnel in the operation, installation and maintenance of the Cambium PTP equipment and ancillary devices. It is recommended that all personnel engaged in such activities be properly trained.

Cambium disclaims all liability whatsoever, implied or express, for any risk of damage, loss or reduction in system performance arising directly or indirectly out of the failure of the customer, or anyone acting on the customer's behalf, to abide by the instructions, system parameters, or recommendations made in this document.

Cross References

References to external publications are shown in italics. Other cross references, emphasized in blue text in electronic versions, are active links to the references.

This document is divided into numbered chapters that are divided into sections. Sections are not numbered but are individually named at the top of each page and are listed in the table of contents.

Feedback

We appreciate feedback from the users of our documents. This includes feedback on the structure, content, accuracy, or completeness of our documents. Send feedback to support@cambiumnetworks.com.

Problems and Warranty

Reporting Problems

If any problems are encountered when installing or operating this equipment, follow this procedure to investigate and report:

- 1 Search this document and the software release notes of supported releases.
- 2 Visit the support website.
- 3 Ask for assistance from the Cambium product supplier.
- 4 Gather information from affected units, such as any available diagnostic downloads.
- 5 Escalate the problem by emailing or telephoning support.

Repair and Service

If unit failure is suspected, obtain details of the Return Material Authorization (RMA) process from the support website.

Hardware Warranty

Cambium's standard hardware warranty is for one (1) year from date of shipment from Cambium Networks or a Cambium distributor. Cambium Networks warrants that hardware will conform to the relevant published specifications and will be free from material defects in material and workmanship under normal use and service. Cambium shall within this time, at its own option, either repair or replace the defective product within thirty (30) days of receipt of the defective product. Repaired or replaced product will be subject to the original warranty period but not less than thirty (30) days.

To register PTP products or activate warranties, visit the support website. For warranty assistance, contact the reseller or distributor.



Caution

Using non-Cambium parts for repair could damage the equipment or void warranty. Contact Cambium for service and repair instructions.

Portions of Cambium equipment may be damaged from exposure to electrostatic discharge. Use precautions to prevent damage.

Security Advice

Cambium Networks systems and equipment provide security parameters that can be configured by the operator based on their particular operating environment. Cambium recommends setting and using these parameters following industry recognized security practices. Security aspects to be considered are protecting the confidentiality, integrity, and availability of information and assets. Assets include the ability to communicate, information about the nature of the communications, and information about the parties involved.

In certain instances Cambium makes specific recommendations regarding security practices, however the implementation of these recommendations and final responsibility for the security of the system lies with the operator of the system.

Warnings, Cautions, and Notes

The following describes how warnings and cautions are used in this document and in all documents of the Cambium Networks document set.

Warnings

Warnings precede instructions that contain potentially hazardous situations. Warnings are used to alert the reader to possible hazards that could cause loss of life or physical injury. A warning has the following format:



Warning

Warning text and consequence for not following the instructions in the warning.

Cautions

Cautions precede instructions and are used when there is a possibility of damage to systems, software, or individual items of equipment within a system. However, this damage presents no danger to personnel. A caution has the following format:



Caution

Caution text and consequence for not following the instructions in the caution.

Notes

A note means that there is a possibility of an undesirable situation or provides additional information to help the reader understand a topic or concept. A note has the following format:

**Note**

Note text.

Caring for the Environment

The following information describes national or regional requirements for the disposal of Cambium Networks supplied equipment and for the approved disposal of surplus packaging.

In EU Countries

The following information is provided to enable regulatory compliance with the European Union (EU) directives identified and any amendments made to these directives when using Cambium equipment in EU countries.



Disposal of Cambium Equipment

European Union (EU) Directive 2002/96/EC Waste Electrical and Electronic Equipment (WEEE)

Do not dispose of Cambium equipment in landfill sites. For disposal instructions, refer to <http://www.cambiumnetworks.com/support>

Disposal of Surplus Packaging

Do not dispose of surplus packaging in landfill sites. In the EU, it is the individual recipient's responsibility to ensure that packaging materials are collected and recycled according to the requirements of EU environmental law.

In non-EU Countries

In non-EU countries, dispose of Cambium equipment and all surplus packaging in accordance with national and regional regulations.

Chapter 1 Before You Start

Safety Precautions & Declared Material

General Equipment Precautions

**Caution**

To avoid malfunctioning or personnel injuries, equipment or accessories/kits/plug-in unit installation, requires qualified and trained personnel. Changes or modifications not expressly approved by Cambium Networks could void the user's authority to operate the equipment.

**Caution**

Where special cables, shields, adapters and grounding kits are supplied or described in this manual, these items must be used, to comply with the FCC regulations.

**Caution**

Use of controls, adjustments, or performing procedures other than those specified herein, may result in hazardous radiation exposure.

**Caution**

When working with an RFU-S, note the following risk of electric shock and energy hazard: Disconnecting one power supply disconnects only one power supply module. To isolate the unit completely, disconnect all power supplies.

**Caution**

Machine noise information order - 3. GPSGV, the highest sound pressure level amounts to 70 dB (A) or less, in accordance with ISO EN 7779.

**Anti Static**

Static electricity may cause body harm, as well as harm to electronic components inside the device. Anyone responsible for the installation or maintenance of the RFU-D must use an ESD Wrist Strap. ESD protection measures must be observed when touching the unit. To prevent damage, before touching components inside the device, all electrostatic must be discharged from both personnel and tools.



Caution

In Norway and Sweden:

Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkøpelt utstyr – og er tilkøpelt et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkøpling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.

Précautions générales relatives à l'équipement



Caution

L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées dans les présentes peut engendrer une exposition dangereuse aux rayonnements.



Caution

L'usage de RFU-S s'accompagne du risque suivant d'électrocution et de danger électrique : le débranchement d'une alimentation électrique ne déconnecte qu'un module d'alimentation électrique. Pour isoler complètement l'unité, il faut débrancher toutes les alimentations électriques.



Caution

Bruit de machine d'ordre - 3. GPSGV, le plus haut niveau de pression sonore s'élève à 70 dB (A) au maximum, dans le respect de la norme ISO EN 7779.

Allgemeine Vorsichtsmaßnahmen für die Anlage



Caution

Wenn andere Steuerelemente verwendet, Einstellungen vorgenommen oder Verfahren durchgeführt werden als die hier angegebenen, kann dies gefährliche Strahlung verursachen.



Caution

Beachten Sie beim Arbeiten mit RFU-S das folgende Stromschlag- und Gefahrenrisiko: Durch Abtrennen einer Stromquelle wird nur ein



Caution

Stromversorgungsmodul abgetrennt. Um die Einheit vollständig zu isolieren, trennen Sie alle Stromversorgungen ab.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäß EN ISO 7779.

ESD

This equipment contains components which are sensitive to "ESD" (Electro Static Discharge). Therefore, ESD protection measures must be observed when touching the IDU.



Anyone responsible for the installation or maintenance of the IDU must use an ESD Wrist Strap.

Additional precautions include personnel grounding, grounding of work bench, grounding of tools and instruments as well as transport and storage in special antistatic bags and boxes.

Laser



Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The optical interface must only be serviced by qualified personnel, who are aware of the hazards involved to repair laser products.

When handling laser products the following precautions must be taken:

- Never look directly into an open connector or optical cable.
- Before disconnecting an optical cable from the optical transmitter, the power should be switched off. If this is not possible, the cable must be disconnected from the transmitter before it is disconnected from the receiver.
- When the cable is reconnected, it must be connected to the receiver before it is connected to the transmitter.

Grounding: This equipment is designed to permit connection between the earthed conductor of the DC supply circuit and the earthing conductor at the equipment.



Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Restricted Access Area: DC powered equipment should only be installed in a Restricted Access Area.

Installation Codes: The equipment must be installed according to country national electrical codes. For North America, equipment must be installed in accordance to the US National Electrical Code, Articles 110-16, 110-17 and 110-18, and the Canadian Electrical Code, Section 12.

Overcurrent Protection: A readily accessible listed branch circuit overcurrent protective device, rated 15 A, must be incorporated in the building wiring.

Grounded Supply System: The equipment shall be connected to a properly grounded supply system. All equipment in the immediate vicinity shall be grounded the same way, and shall not be grounded elsewhere.

Local Supply System: The DC supply system is to be local, i.e. within the same premises as the equipment.

Disconnect Device: A disconnect device is not allowed in the grounded circuit between the DC supply source and the frame/grounded circuit connection.

RoHS Compliance Declaration



Caution

Electronic Information Products Declaration of Hazardous/Toxic Substances

Component	Hazardous Substance					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr VI)	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB/Circuit Modules	Comply	Comply	Comply	Comply	Comply	Comply
Mechanical Parts	Comply	Comply	Comply	Comply	Comply	Comply
Cables	Comply	Comply	Comply	Comply	Comply	Comply

Pre-installation Instructions

Packing

The equipment must be packed and sealed in moisture absorbing bags.

Transportation and Storage

The equipment cases are prepared for shipment by air, truck, railway and sea, suitable for handling by forklift trucks and slings. The cargo must be kept dry during transportation, in accordance with ETS 300 019-1-2, Class 2.3. For sea-transport, deck-side shipment is not permitted. Carrier-owned cargo containers should be used.

It is recommended that the equipment be transported to the installation site in its original packing case.

If intermediate storage is required, the packed equipment must be stored in a dry and cool environment, and out of direct sunlight, in accordance with ETS 300 019-1-1, Class 1.2.

Unpacking

The equipment is packed in sealed plastic bags and moisture absorbing bags are inserted. Any separate sensitive product, i.e. printed boards, are packed in anti-static handling bags. The equipment is further packed in special designed cases.

Marking is done according to standard practice unless otherwise specified by customers. The following details should be marked:

- Customers address
- Contract No
- Site name (if known)
- Case No

Inspection

Check the packing lists and ensure that correct parts numbers quantities of goods have arrived. Inspect for any damage on the cases and equipment. Please report any damage or discrepancy to Cambium Networks support by e-mailing to support@cambiumnetworks.com.

Chapter 2 PTP 820F Hardware Overview

PTP 820F is a compact unit that fits in a single rack unit, with a passive cooling system that eliminates the need for fans. A PTP 820F system consists of a PTP 820F indoor unit (IDU) and up to three radio frequency units (RFUs). The IDU is connected to each RFU by a standard Cat-5e or preferably Cat-6/6e cable, with RF-45 connectors on the RFU and electrical or optical fiber via SFP on the IDU. This cable transmits traffic and management data between the IDU and the RFU. For RFU-S and RFU-D connected to an electrical RFU interface on the IDU, this cable also provides DC -48V power to the RFU. For RFU-S or RFU-D using an optical fiber connection, and for RFU-D-HP using an electrical or optical fiber connection, an external DC power cable is required.

A PTP 820F IDU contains:

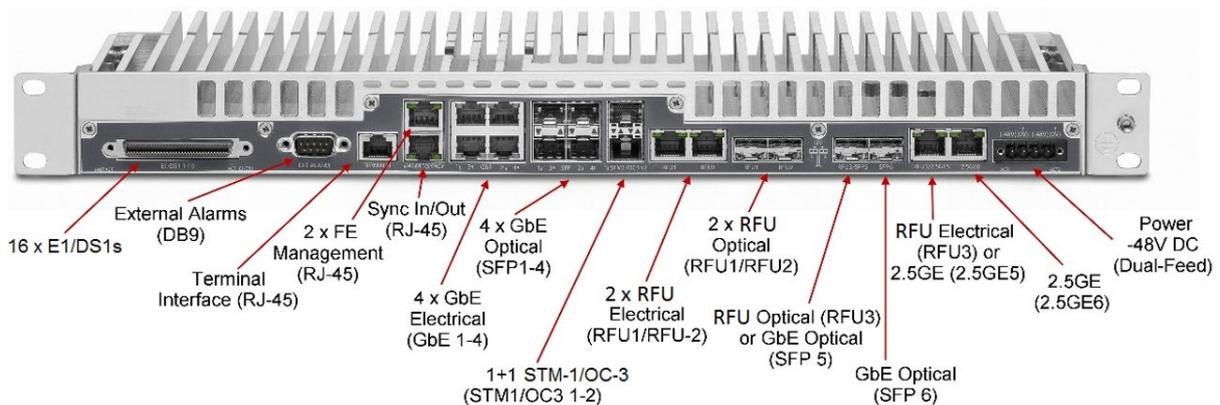
- Three 1 GbE combo interfaces
- Two dual mode GbE or cascading combo interfaces
- Two combo (RJ-45 or SFP) radio interfaces
- An additional interface that can be configured as a combo (RJ-45 or SFP) radio interface or a 1 GbE interface

For TDM traffic, a PTP 820F IDU includes a 16 x E1/DS1 interface and two STM 1/OC-3 interfaces that require the addition of an optional rear-mounted STM-1/OC-3 module. The STM-1/OC-3 interfaces can be used in a 1+1 STM 1/OC 3 protection configuration.

The IDU also includes two FE management interfaces, a DB9 dry contact external alarms interface, and an RJ-45 terminal console interface for connection to a local craft terminal. Optionally, one of the FE management interfaces can be used as an RJ-45 synchronization interface.

PTP 820F receives an external supply of -48V, with a dual-feed option for power redundancy.

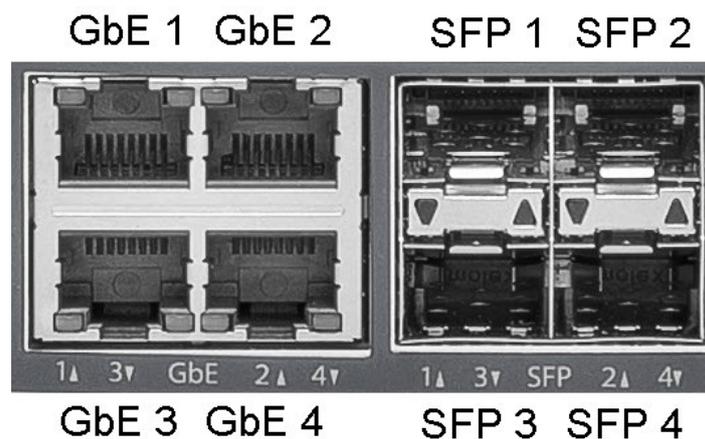
Figure 1 PTP 820F Front Panel and Interfaces



Ethernet Traffic Interfaces

The front panel of the PTP 820F contains 4 x GbE combo interfaces (electrical or optical) for Ethernet traffic. These interfaces are numbered as shown in Figure 2.

Figure 2 GbE Combo Interface Numbering



Note

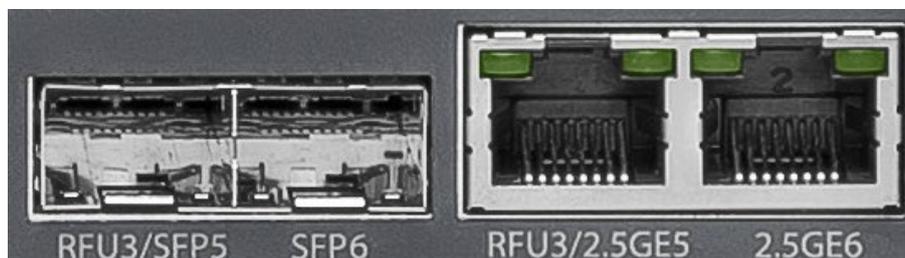
When using electrical ports GbE 1 through GbE 4 to connect between the PTP 820F IDU and an outdoor unit such as PTP 820C or PTP 820S, in areas in which severe lightning conditions are likely to occur, it is required to use lightning protection.

GbE 1/SFP 1 and GbE 2/SFP 2 can be configured as normal Ethernet traffic interfaces or as cascading interfaces. When operating in cascading mode, these interfaces can handle hybrid Ethernet and Native TDM traffic, enabling operators to create links among multiple PTP 820 units in a node for multi-directional applications based on hybrid Ethernet and Native or pseudowire TDM services.

In addition, two pairs of electrical and optical interfaces towards the right of the front panel can be used to provide either two Ethernet interfaces or one Ethernet interface and one radio interface:

- RFU3/SFP5 and RFU3/2.5GE5 - A combo interface that can be used as either an SFP or RJ-45 RFU interface or an SFP or RJ-45 Ethernet interface.
- SFP6/2.5GE6 - A combo interface (SFP or RJ-45) for Ethernet.

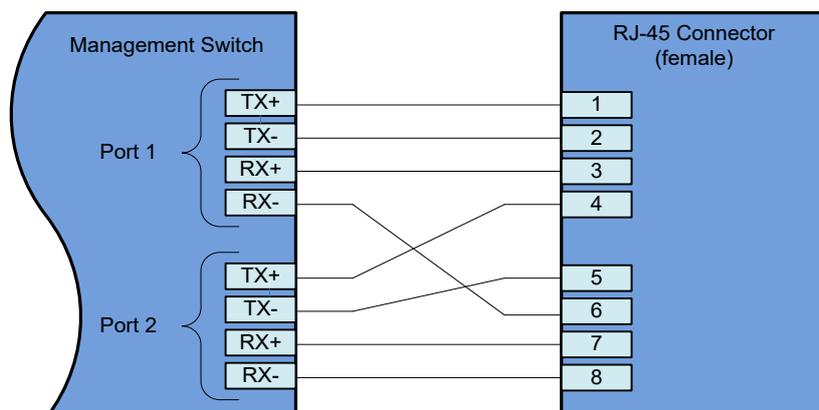
Figure 3 RFU3/SFP5-6 Interfaces



Ethernet Management Interfaces

PTP 820F contains two FE management interfaces, which connect to a single RJ-45 physical connector on the front panel. The RJ-45 connector is the upper RJ 45 interface in a pair of interfaces labeled MGMT/SYNC.

Figure 4 Management Interface Pin Connections



Management Interface Cable Options

If the user only needs to use a single management interface, a standard Cat5 RJ-45 cable (straight or cross) can be connected to the MGMT interface.

To access both management interfaces, a special 2 x FE splitter cable can be ordered from Cambium.

Table 1 2 x FE Splitter Cable Marketing Model

Part Number	Description
N000082L122A	PTP 820G Ethernet split cable for Management

E1/DS1 Interface

PTP 820F includes an MDR69 connector in which 16 E1 interfaces are available (ports 1 through 16).

STM-1/OC-3 Interfaces

The PTP 820F includes two ch-STM-1/OC-3 ports, which can be used as a 1+1 STM-1/OC-3 protection configuration. The STM-1/OC-3 port provides an interface for up to 63 E1 or 84 DS1 lines inside a standard channelized STM-1 or OC-3 signal. Each E1/DS1 line is transported by a VC-12 container, which behaves like a regular line interface.



Note

STM-1/OC-3 requires the addition of an optional rear-mounted STM-1/OC-3 module, which is planned for future release.

Radio Interfaces

PTP 820F includes two combo radio interfaces (RJ-45 or SFP, RFU1 and RFU2). A third interface can also be used as a combo radio interface (RJ-45 or SFP, RFU3).

**Note**

For some RFUs, PoE power can be supplied directly from the IDU via an RJ-45 radio interface. See [IDU-RFU Cable Connection](#).

Power Interfaces

PTP 820F receives an external supply of -48V current via a dual-feed power interface, which can be connected to two separate power sources for power redundancy. The PTP 820F monitors the power supply for under-voltage and includes reverse polarity protection, so that if the positive (+) and negative (-) inputs are mixed up, the system remains shut down.

The allowed power input range for the PTP 820F is -40V to -60V. An under-voltage alarm is triggered if the power goes below the allowed range, and an over voltage alarm is triggered if the power goes above the allowed range.

Synchronization Interface

PTP 820F includes an RJ-45 synchronization interface for T3 clock input and T4 clock output. The interface is the lower RJ-45 interface in a pair of interfaces labeled MGMT/SYNC.

Terminal Interface

PTP 820F includes an RJ-45 terminal interface (RS-232). A local craft terminal can be connected to the terminal interface for local CLI management of the unit.

External Alarms

PTP 820F includes a DB9 dry contact external alarms interface. The external alarms interface supports five input alarms and a single output alarm.

The input alarms are configurable according to:

1. Intermediate
2. Critical
3. Major
4. Minor
5. Warning

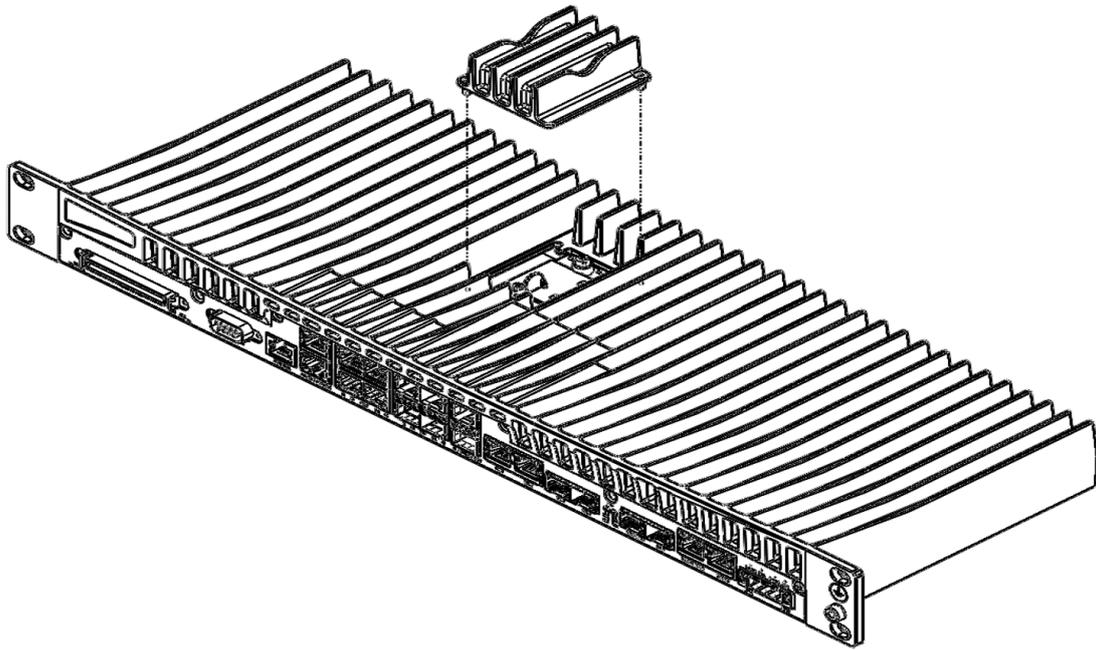
The output alarm is configured according to predefined categories.

Storage Memory Card

Each PTP 820F unit includes a Storage Memory card (SM card). The SM card holds the configuration and software for the IDU. The SM-Card is embedded in the SM-Card plastic cover that is located under the SM-card aluminum cover. In the event of IDU replacement, re-using the existing SM card cover is necessary to ensure that the unit's software and configuration is maintained.

An SM card is pre-installed inside each PTP 820F unit. It can also be ordered as a separate item (e.g., as a spare unit).

Figure 5 SM Card and Cover



Chapter 3 Preparing for Installation

This section provides instructions for transporting, inspecting, and unpacking the equipment for an PTP 820F system prior to installation.

Transportation/Storage

The equipment cases are prepared for shipment by air, truck, railway and sea, suitable for handling by forklift trucks and slings. The cargo must be kept dry during transport and storage.

For sea-transport, deck-side shipment is not permitted. Carrier-owned cargo containers should be used.

It is recommended that the equipment is transported to the installation site in its original packing cases.

If any intermediate storing is required, all cases must be stored under dry and cool conditions and out of direct sunlight.

Inspection

Check the packing lists and ensure that correct parts numbers quantities of goods have arrived.

Inspect for any damage on the cases and equipment. Report any damage or discrepancy to a Cambium representative, by e-mail or fax.

Unpacking Equipment at the Site

The equipment is packed in sealed plastic bags and moisture absorbing bags are inserted. Any separate sensitive product, i.e. printed boards, are packed in anti-static handling bags. The equipment is further packed in special designed cases.

Marking is done according to standard practice unless otherwise specified by customers.

- Customers address
- Contract No
- Site name (if known)
- Case No

Dimensions and weight of each case are specified in the packing specification issued for the respective shipment.



Caution

It is essential that whenever unpacking or disassembling the equipment and handling printed circuit boards, special precautions should be taken to avoid ESD (Electrostatic Static Discharge). Generally, units with static discharge protection should not be unpacked until the installation takes place.

Ensure you are properly grounded at a controlled ESD point before and during unpacking and handling of any sensitive component.

To avoid malfunctioning or personnel injuries, equipment or accessories/kits/plug-in unit installation, requires qualified and trained personnel.

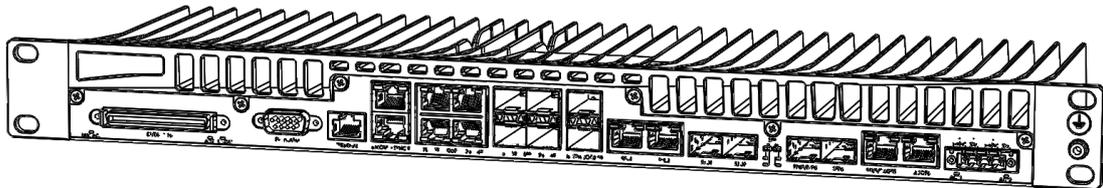
Changes or modifications not expressly approved by Cambium Networks could void the user's authority to operate the equipment

Where special cables, shields, adapters and grounding kits are supplied or described in this manual, these items must be used, to comply with the relevant regulations.

Chapter 4 Installing the PTP 820F IDU

This section provides instructions for installing a PTP 820F IDU.

Figure 6 IDU (Full Configuration)



Kits Required to Perform the Installation

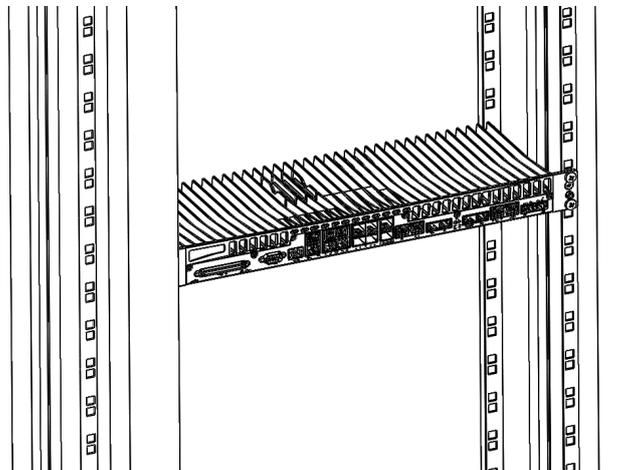
Description	Quantity
PTP 820F chassis	1
19" rack / sub-rack	1
SM-Card Cover	1

Tools

- Philips screwdriver
- Flat screwdriver

Installing the PTP 820F IDU in the Rack (19")

Insert and hold the PTP 820F IDU in the rack, as shown in the following figures. Use four screws (not supplied with the installation kit) to fasten the IDU to the rack.



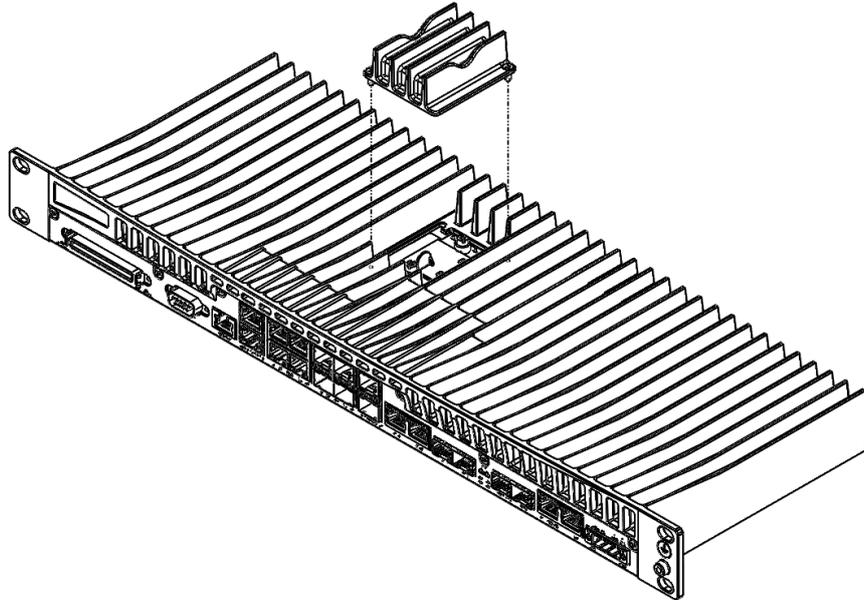
Replacing an PTP 820F IDU or SM-Card

If you should need to replace the PTP 820F IDU, you must first remove the SM-Card Cover so that you can insert it into the new IDU.

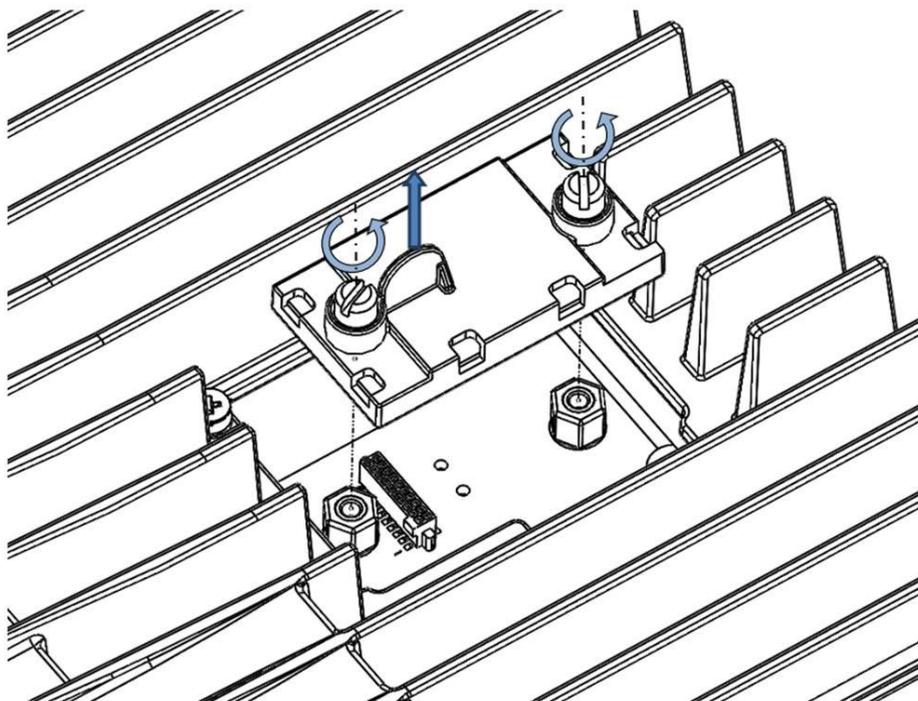
The SM-Card holds the configuration and software for the IDU. The SM-Card is embedded in the SM-Card plastic cover that is located under the SM-card aluminum cover.

To remove the SM-Card:

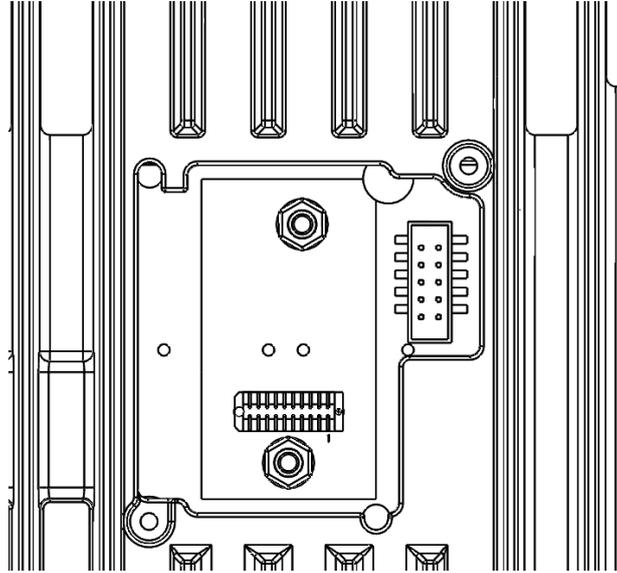
1. Switch the unit power off.
2. Loosen the 2 screws of the SM-Card's aluminum cover and remove it from the IDU.



3. Loosen the 2 screws of the SM-Card Plastic Cover and gently remove it from the IDU.



4. In the new IDU or, if you are upgrading the SM-Card, the old IDU, make sure that there is no foreign matter blocking the sockets in the opening where the SM-Card is installed.



5. Gently place the SM-Card in its place and tighten the 2 screws.
6. Place the SM-Card's aluminum cover in its place and tighten the 2 screws.

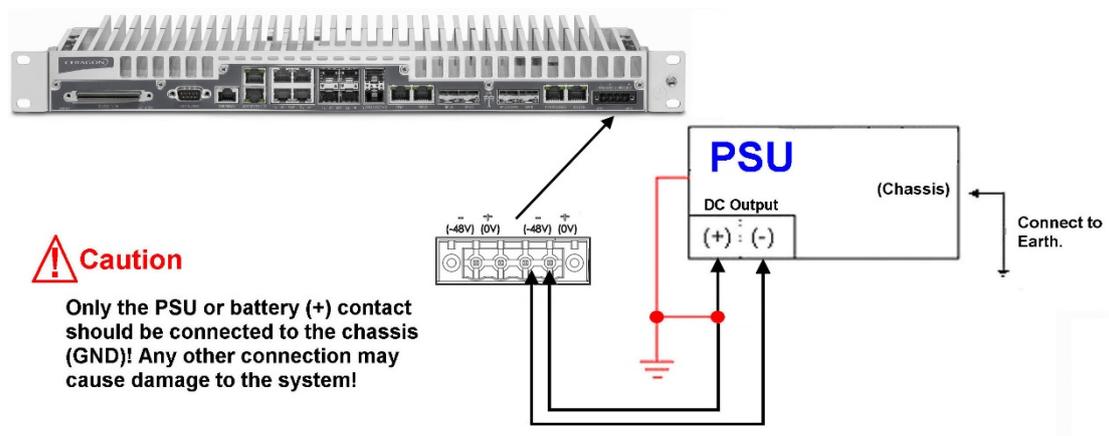
Chapter 5 Connecting the Power Cable



Note

Before connecting the power supply to the PTP 820F unit, you must verify that the positive pole in the external power supply is grounded! Power supply grounding should be in according with the following figure.

Figure 7 Power Supply Grounding

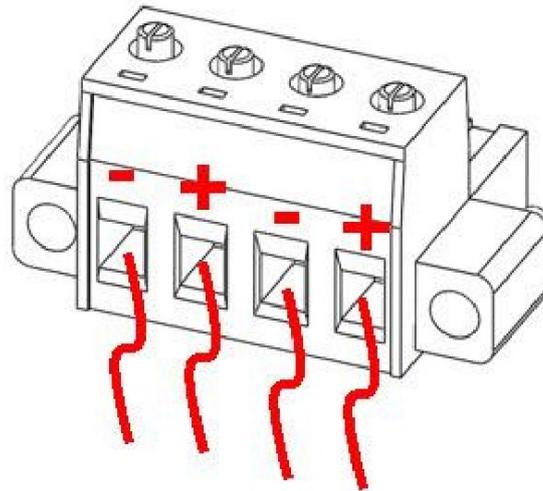


PTP 820F utilizes a dual-feed power interface, which can be connected to two separate power supplies for power redundancy. A power cable connector is included with the PTP 820F unit.

To connect a power cable to the PTP 820F:

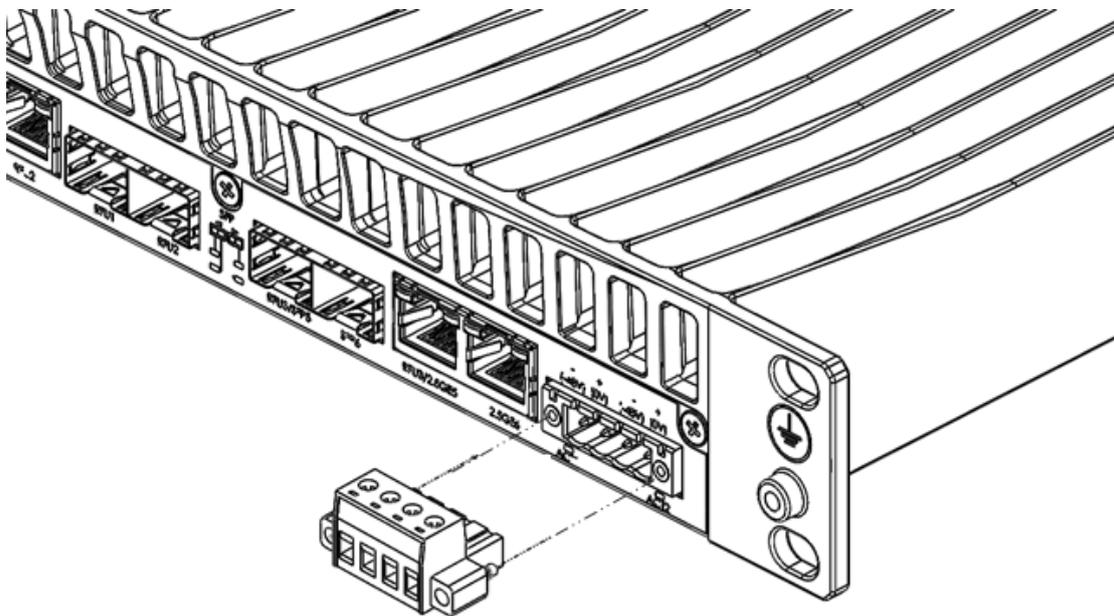
1. Expose the wires of the power cable.
2. Loosen the top two screws on the connector.
3. Verify that the wiring is according to the correct polarity.

Figure 8 Correct Wiring of Power Connector



4. Insert the wires into the connector.
5. Secure the wires in the connector with the screws.
6. Plug the connector into the PTP 820F power interface and tighten the two screws on the sides of the connector to secure the connector.

Figure 9 Connecting the Power Cable



Chapter 6 Power Supply Notes

When selecting a power source, the following must be considered:

- Voltage range: -40 VDC to -60 VDC.
- Recommended: Availability of a UPS (Uninterrupted Power Source), battery backup, and emergency power generator.
- The power source must be grounded.
- The unit has more than one supply connection - Remove all power from the unit for servicing.



Note

Make sure to use a circuit breaker to protect the circuit from damage by short or overload. In a building installation, the circuit breaker shall be readily accessible and incorporated external to the equipment. The maximum rating of the overcurrent protection shall be 10 Amp, while the maximum current rating is 6.5A (@40V in) when operating with five carriers, and 7.5A when operating with five carriers and an STM-1 module (optional, planned for future release).

Chapter 7 IDU-RFU Cable Connection

RFU-D, RFU-D-HP and RFU-S can be connected to the PTP 820F IDU via a standard CAT-5e or preferably CAT-6/6a cable, with RJ-45 connectors on the RFU and an RJ-45 connector on the IDU. They can also be connected to the IDU over optical fiber cables via the optical (SFP) RFU interface on the IDU.

For an RFU-D, or RFU-S connecting to an electrical RFU interface, the cable can carry both the data and the DC power required for the RFU. For configuration instructions, refer to the User Guide for PTP 820F, PTP 820G.

For an RFU-D, or RFU-S connecting to an optical RFU interface, and for an RFU-D-HP connecting to either an electrical or an optical RFU interface, an external DC power cable is required to supply power to the RFU.

Table 2: IDU-RFU Cable Connection

RFU	Interface	Cable Type	Maximum Length	
			6-11 GHz	13-42 GHz
RFU-D	Optical	Fiber	300m	
	Electrical	CAT-5e (24 AWG)	65m	100m
		CAT-6a (22 AWG)	110m	150m
	DC Power	DC (18 AWG)	100m	
		DC (12 AWG)	101m-300m	
RFU-S	Optical	Fiber	300m	
	Electrical	CAT-5e (24 AWG)	130m	150m
		CAT-6a (22 AWG)	150m	150m
	DC Power	DC (18 AWG)	150m	
		DC (14 AWG)	151m-300m	
RFU-D-HP	Optical	Fiber	300m	
	Electrical	CAT-5e (24 AWG)	150m	
		CAT-6a (22 AWG)	150m	
	DC Power	DC (14 AWG)	100m	
		DC (10 AWG)	101m-300m	

Chapter 8 Performing Initial Configuration

This section describes how to establish a management connection with the PTP 820F unit and lists the configuration steps that should be performed in order to enable basic radio connectivity. For detailed configuration instructions, refer to the User Guide for PTP 820F, PTP 820G.

Establishing a Connection

You can connect to the PTP 820F unit using a TP cable with a LAN connection or using a Serial RS-232 cable.

Connecting to the Unit with a Serial Connection

1. Connect an RS-232 cable with an RJ-45 interface from your laptop or PC to the Terminal Interface on the PTP 820F front panel.

Figure 10: Terminal Interface



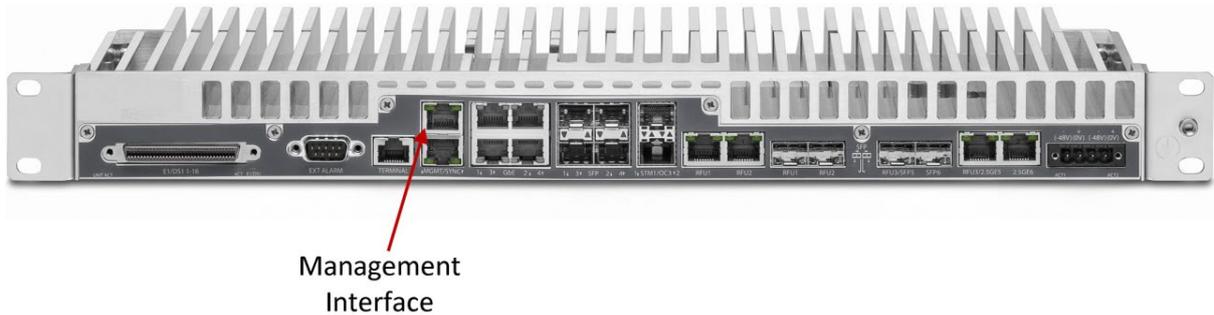
2. Configure the following settings for the COM port you are using on your PC or laptop:
 - Bits per Second - 115,200
 - Data Bits - 8
 - Parity - None
 - Stop Bits - 1
 - Flow Control - None

Connecting to the Unit with a LAN Connection

PTP 820F contains two FE management interfaces, which connect to a single RJ-45 physical connector on the front panel (MGMT). For details on which type of cable to use to utilize either one or both management interfaces, refer to Management Interface Cable Options.

Connect the cable to Management interface (MGMT) on the PTP 820F front panel, and to the LAN port on the PC.

Figure 11: Management Interface



To establish a connection between the PC and the PTP 820F unit, it is necessary to have an IP address on the PC within the same subnet as the unit. The default IP address of the PTP 820F unit is 192.168.1.1. Set the PC address to e.g. 192.168.1.10 and subnet mask to 255.255.255.0. Note the initial settings before changing.



Note

The chassis IP address, as well as password, should be changed before the system is set in operation. For more information on these procedures, refer to the User Guide for PTP 820F, PTP 820G

1. Select Control Panel> All Control Panel Items >Network and Sharing Center.
2. Click Change adapter settings.
3. Select Local Area Connection> Properties> Internet Protocol Version 4 (TCP/IP).
 - o IP address: 192.168.1.10
 - o Subnet mask 255.255.255.0
 - o No default gateway
4. Press OK to apply the settings.

Logging On

1. Open an Internet browser (Internet Explorer or Mozilla Firefox).
2. Type in the default IP address "192.168.1.1" in the Address Bar.

Figure 12 Login Window



3. Enter the following values:
 - o User Name: admin
 - o Password: admin
4. Click Apply.

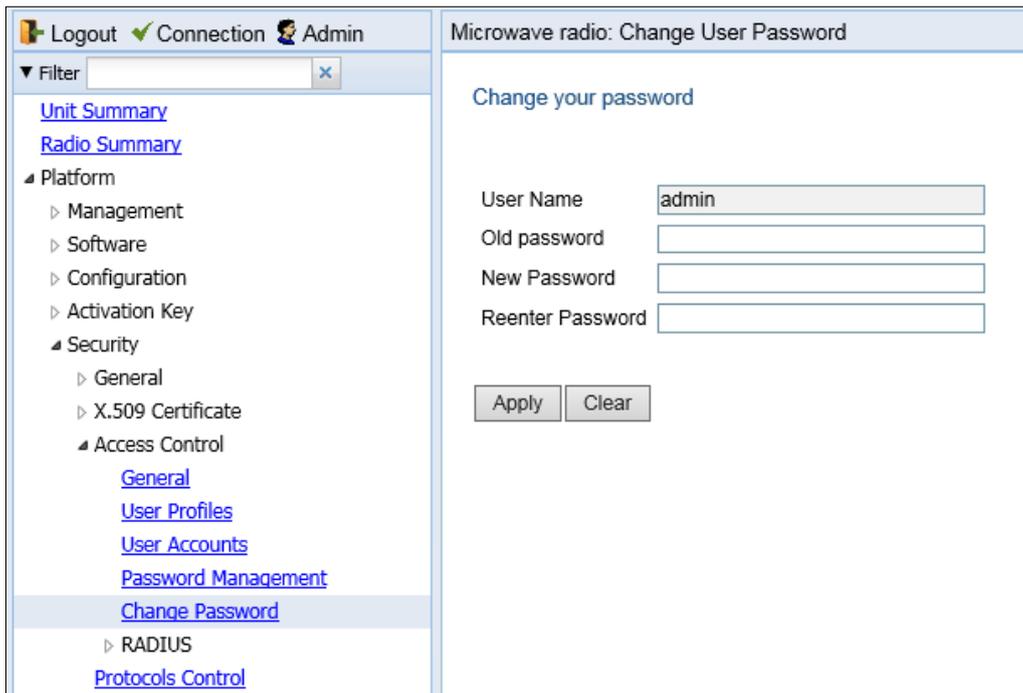
Changing Your Password

It is recommended to change your default Admin password as soon as you have logged into the system.

To change your password:

1. Select Platform > Security > Access Control > Change Password. The Change User Password page opens.

Figure 13: Change User Password Page



The screenshot shows a web interface for changing a user password. On the left is a navigation menu with a search filter and a tree view containing sections like Platform, Security, and Access Control. The 'Change Password' option is highlighted. The main content area is titled 'Microwave radio: Change User Password' and contains the heading 'Change your password'. Below this are four input fields: 'User Name' (pre-filled with 'admin'), 'Old password', 'New Password', and 'Reenter Password'. At the bottom of the form are 'Apply' and 'Clear' buttons.

2. In the Old password field, enter the current password. For example, upon initial login, enter the default password (admin).
3. In the New password field, enter a new password. If Enforce Password Strength is activated, the password must meet the following criteria:
 - Password length must be at least eight characters.
 - Password must include characters of at least three of the following character types: lower case letters, upper case letters, digits, and special characters. For purposes of meeting this requirement, upper case letters at the beginning of the password and digits at the end of the password are not counted.
 - The last five passwords you used cannot be reused.
4. Click Apply.

In addition to the Admin password, there is an additional password protected user account, “root user”, which is configured in the system. The root user password and instructions for changing this password are available from Cambium Customer Support. It is strongly recommended to change this password.

Configuration

Before connection over the radio hop is established, it is of high importance that the elements are assigned a dedicated IP address, according to an IP plan for the total network.

By default, all elements have the same IP settings:

- IP address: 192.168.1.1
- Subnet mask: 255.255.255.0



Note

After the new IP address is set, the contact with the element will be lost. In order to reconnect, the PC must have an IP address within the same subnet as the element.

In addition to setting the IP addresses, the following configuration steps should be performed to establish basic connectivity. For a detailed description of these procedures, refer to the User Guide for PTP 820F, and PTP 820G.

- Enable the Radio Interfaces
- Set the Radio Frequencies
- Configure the License
- Unmute the Radio

Chapter 9 Specifications

Environmental Specifications for IDU

- Operating: ETSI EN 300 019-1-3 Class 3.2
- Temperature:
 - -5 °C (23 F) to 55 °C (131 F) - Temperature range for continuous operating temperature with high reliability.
 - -25 °C (-13 F) to 65 °C (149 F) - Temperature range for exceptional temperatures, tested successfully, with limited margins.



Note

Cold startup requires at least -5°C (23F).

- Humidity: 5%RH to 95%RH

Environmental Specifications for RFU

- Operating: ETSI EN 300 019-1-4 Class 4.1
- Temperature:
 - -33°C (-27F) to +55°C (131F) - Temperature range for continuous operating temperature with high reliability:
 - -45°C (-49F) to +60°C (140F) - Temperature range for exceptional temperatures; tested successfully, with limited margins.
- Humidity: 5%RH to 100%RH

Mechanical Specifications

Table 3: IDU Mechanical Specifications

IDU Dimensions	Height: 44 mm
	Width: 482 mm
	Depth: 165 mm
	Weight: 2.4 kg

IDU-RFU Connection

An RFU-S, RFU-D, and RFU-D-HP can be connected to an PTP 820F IDU via a standard CAT-5e or CAT-6 cable, with RJ-45 connectors on the RFU and one of the RJ-45 RFU interfaces on the PTP 820F. They can also be connected to the IDU over optical fiber cables via one of the optical (SFP) RFU interfaces on the IDU.

For an RFU-S, or RFU-D connecting to an RJ-45 RFU interface, the cable carries both the data and the DC power required for the RFU.

For an RFU-S, or RFU-D connecting to an SFP RFU interface, and for an RFU-D-HP connecting to either an RJ-45 or an SFP RFU interface, an external DC power cable is required to supply power to the RFU.

Power Consumption Specifications

The following table shows the maximum power consumption for PTP 820F IDU and supported RFUs. The maximum power consumption for the entire system is the sum of the IDU and the RFUs connecting to it.

Configuration	Power (W)	Comments
IDU	48W maximum	
IDU with STM-1 Module	71W maximum	
RFU-S	43W	RFU only
RFU-D	75W	RFU only
RFU-D-HP	130W/180W (with fans, all-indoor)	RFU only

Chapter 10 Acceptance and Commissioning Procedures

This chapter provides Cambium's recommended Acceptance and Commissioning Procedure for PTP 820. Acceptance and commissioning should be performed after initial setup is complete.

The purpose of this procedure is to verify correct installation and operation of the installed link and the interoperability with customer end equipment.

Cambium's Acceptance and Commissioning procedure includes the following stages:

- Site Acceptance Procedure
- Commissioning of radio link

The Site Acceptance Procedure is a checklist that summarizes the installation requirements of the site at which the products were installed.

The commissioning tests cover the required configuration information that should be recorded, and the tests that should be performed on the radio link.

Site Acceptance Procedure

The purpose of the following procedures is to verify that all installation requirements were noted and checked. Following this procedure will ensure proper, long-lasting, and safe operation of the product.

The checklist below summarizes the installation requirements of the site.

SITE ACCEPTANCE CHECKLIST

1. SITE INFORMATION

Customer:

Radio model:

Site name:

Site code:

Radio link code:

Site address:

2. ANTENNA MOUNTING

Antenna mount type:

Mount is of sufficient height to clear local obstructions OK

Mount is safely positioned to not cause a safety hazard OK

Mount is secure and perpendicular OK

SITE ACCEPTANCE CHECKLIST

Mount is grounded as per site specifications	OK
--	----

All steelwork is Galvanized or Stainless Steel as appropriate	OK
---	----

3. ANTENNA

Antenna type (model and size):

Antenna is securely fixed to mount	OK
------------------------------------	----

Antenna is grounded as per site specifications	OK
--	----

Antenna sway braces are installed correctly (where applicable)	OK
--	----

Antenna Radome is securely fitted (where applicable)	OK
--	----

Water drain plugs are fitted and removed, as appropriate	OK
--	----

Antenna sealing O-Ring is properly fitted and not damaged	OK
---	----

Antenna/Launch unit polarization is as per link requirements	OK
--	----

4. RADIO FREQUENCY UNIT (RFU)

Type of RFU mount:	(Direct or Remote mount)
--------------------	--------------------------

RFU is securely mounted to the antenna or pole	OK
--	----

RFU is grounded as per installation instructions	OK
--	----

RFU's polarization is as per link requirements	OK
--	----

RFU is installed properly and has no physical damage	OK
--	----

For Remote-Mount Only:

Remote mount kit is securely mounted to the pole	OK
--	----

Flexible waveguide has no physical damage and connectors are sealed	OK
---	----

All flexible waveguide bolts are secured using washers and lock-washers, as appropriate	OK
---	----

Flexible waveguide is secured to the pole	OK
---	----

5. COAX CABLE

Overall cable length

Cable type

N-Type connectors assembled properly on the cable	OK
---	----

SITE ACCEPTANCE CHECKLIST

Cable connected securely to RFU and IDU	OK
Cable connector is weather-proofed (sealed) at the RFU	OK
At the RFU, cable has a service/drip loop to prevent moisture from entering the connector	OK
Cable is secured using suitable restraints to fixed points at regular intervals (0.5 m recommended)	OK
Cable has no sharp bends, kinks, or crushed areas. All bends are per manufacturer specifications	OK
Grounding/lightning protection is as per site specifications	OK
Lightning protection type and model:	
Cable point-of-entry to building/shelter is weather-proof	OK
Cable ends are properly labeled	OK
6. FLEXIBLE WAVEGUIDE	
Overall flexible WG length:	
Flexible WG type:	
Flexible WG is connected securely to RFU and Antenna	OK
Flexible WG connector is weather-proofed (sealed) at the RFU	OK
At the RFU, the flexible WG has a service/drip loop to prevent moisture from entering the connector	OK
Flexible WG is secured using suitable restraints to fixed points at regular intervals (0.5 m recommended)	OK
Flexible WG has no sharp bends, kinks, or crushed areas. All bends are per manufacturer specifications	OK
Flexible WG point-of-entry to building/shelter is weather-proof	OK
Flexible WG ends are properly labeled	OK
7. INDOOR UNIT	
IDU is securely mounted to the rack	OK
IDU is located in a properly ventilated environment	OK
IDU fans are functional and air flow to the fans is not disrupted	OK
IDU and rack are grounded as per site specifications	OK

SITE ACCEPTANCE CHECKLIST

Traffic cables and connections are properly terminated as per manufacturer/cable instructions OK

All cabling is secured, tidy, and visibly labeled OK

8. DC POWER SUPPLY - Two Inputs

Measured DC voltage input to the IDU: (-40.5 to -60 VDC)

Power-Supply maximum current: (at least 3 Ampere per carrier)

Power-Supply is properly grounded OK

DC power backup type:

IDU DC connector is secure and the DC input leads are correctly terminated (no bare wires are visible) OK

IDU DC connector (+) and (GND) leads are shorted and GND is grounded OK

9. RACK INSTALLATION

Rack is mounted to the shelter floor with four screws OK

Rack is mounted to the shelter wall with two screws OK

10. REMARKS/NOTES

11. GENERAL INFORMATION

Site accepted by:

	Name:

	Title:

	Company:

	Signature:

	Date:

Site approved by:

	Name:

	Title:

	Company:

	Signature:

Site Acceptance Checklist Notes

The following notes provide important additional information about the Site Acceptance Checklist.

1. Antenna Mounting

- Mounting pole is of sufficient height to clear local obstructions, such as parapets, window cleaning gantries, and lift housings.
- Mounting Pole is of sufficient height, and is safely positioned, so as not to cause a safety hazard. No person should be able to walk in front of, or look directly into the path of the microwave radio beam. Where possible, the pole should be away from the edge of the building.
- Mounting pole is secure and perpendicular. A pole that is not perpendicular may cause problems during antenna alignment.
- Mounting pole is grounded as per site specifications. All operators and site owners have specific requirements regarding the grounding of installations. As a minimum, typical requirements are such that any metal structure must be connected to the existing lightning protection ground of the building. Where it extends beyond the 45-degree cone of protection of existing lightning conductors, additional lightning protectors should be installed.
- All steelwork is Galvanized or Stainless Steel, as appropriate to prevent corrosion.

2. Antenna

- Antenna is grounded as per site specifications. See the third point in the Antenna Mounting section above.
- Antenna sway braces are fitted and installed correctly, where applicable. Typically, for an antenna of 1.2 m or larger, an extra sway brace is fitted to the mounting frame of the antenna. This sway brace should not be mounted to the same pole as the antenna but should be installed directly back to the tower or an alternative point.
- Antenna Water Drain Plugs are fitted and removed, where appropriate. Some antennas have moisture drain plugs installed at various points around the antenna. The purpose of these plugs is to allow any moisture that forms on the inside of the antenna or radome to drip out and prevent a pool within the antenna. Only the plugs at the bottom of the antenna, after installation, should be removed. All other plugs should be left in position.

3. RFU (Outdoor Unit)

- The RFU is grounded as per installation instructions. See the third point in the Antenna Mounting section above.
- The RFU polarization is as per link requirements and matches the polarization of the antenna.

4. Indoor Unit

- The main traffic connections are correctly terminated and crimped as per cable and connector manufacturer instructions. All fiber optic patch leads should be routed carefully and efficiently, using conduits to prevent damage to the cables.
- All other user terminations are secure and correctly terminated.

- All labeling is complete as per site requirements. Labeling is specific to each customer. At a site with only one installation, labeling may be unnecessary. However, at sites with multiple installations, correct and adequate labeling is essential for future maintenance operations.

Typical labeling requirements include:

- Antenna labels - for link identity and bearing
- RFU labels - for link identity, frequency, and polarization
- Coax cable labels - for link identity, close to the RFU, IDU, and either end of any joint
- IDU labels - for link identity

Radio Link Commissioning Procedure

Scope

This section describes the recommended commissioning tests for PTP 820 radio link in a 1+0 configuration.

The purpose of the commissioning tests is to verify correct and proper operation of the product.

Commissioning Test

The following tests should be performed on each installed link.

Link Verification

- Received Signal Level (RSL) is up to +/- 4 dB from the expected (calculated) level at both ends of the link.
- Radio Bit Error Rate (BER) is 10E-11 or lower.
- If working with ATPC, ATPC is operating as expected (RSL = reference level).

Ethernet Line Interfaces Test

- Connect Ethernet Packet Analyzer to the GbE port. Use physical loop at remote end (or connect second analyzer). Run Packet Loss test for at least one hour (load rate as per Cambium's specifications for the chosen MRMC).
- Connect Ethernet Packet Analyzer to the FE port. Use physical loop at remote end (or connect second analyzer). Run Packet Loss test for at least one hour (load rate as per Cambium's specifications for the chosen MRMC).

Interoperability Verification

- Connect customer end equipment to the line interfaces and verify correct operation.
- Further interoperability tests should be performed in accordance with the specific requirements of the connected end equipment.

Management Verification

- Launch the HTTP management and verify that you can manage the link and that you are able to perform changes to the link configuration (frequency channel, Tx power, system name, time & date, etc.)
- Verify that correct parameters are reported when performing the above.
- Verify that there are no active alarms on the link.
- If the management station is located at a remote site (Network Operation Center), verify that the management station can manage the link and receive traps.

PTP 820 Commissioning Log

The Commissioning Log is an integral part of the commissioning procedure and should be filled in for each installed link.

The Commissioning Log gathers all relevant information regarding the installed link and contains a checklist of all recommended commissioning tests.

Maintaining the Commissioning Log is important for tracking your installations, and to provide essential data for Cambium Networks.

Upon completing the Commissioning Log, send the log to Cambium support center at support@cambiumnetworks.com.

PTP 820 LINK COMMISSIONING LOG

1. GENERAL INFORMATION

Customer:

Radio model:

Configuration:

Radio link code:

Site 1 name & add:

Site 2 name & add:

2. RFU

Site 1

Site 2

RFU model:

RFU p/n:

RFU s/n:

RFU SW:

IDU model:

IDU p/n:

IDU s/n:

IDU SW:

Tx frequency (MHz):

Rx frequency (MHz):

Link ID:

Tx power (dBm):

PTP 820 LINK COMMISSIONING LOG

ATPC on/off:

ATPC ref level:

RFU Polarization:

3. ANTENNA AND RFU MOUNT	Site 1	Site 2
---------------------------------	---------------	---------------

Antenna vendor and model:

Antenna size:

Mounting type:

Mounting losses:

4. LINK PARAMETERS	Site 1	Site 2
---------------------------	---------------	---------------

Link distance:

Rain zone:

Expected RSL (dBm):

Expected Diversity RSL (dBm):

RSL Main (dBm):

RSL Diversity (dBm):

Deviation from exp?

RSL \leq 4 dB?

5. COMMISSIONING TESTS	Site 1	Site 2
-------------------------------	---------------	---------------

Line loopback:	Pass	Pass
----------------	------	------

RFU loopback:	Pass	Pass
---------------	------	------

Radio BER:	Pass	Pass
------------	------	------

FE test:	Pass	Pass
----------	------	------

GbE test:	Pass	Pass
-----------	------	------

6. MANAGEMENT CONFIGURATION	Site 1	Site 2
------------------------------------	---------------	---------------

Eth IP Address:

Eth IP mask:

PTP 820 LINK COMMISSIONING LOG

Default router:

In-band VLAN

7. REMARKS/NOTES

8. INSTALLATION INFORMATION

Installed by: Name: _____
Company: _____
Date: _____
Signature: _____

Commissioned by: Name: _____
Company: _____
Date: _____
Signature: _____